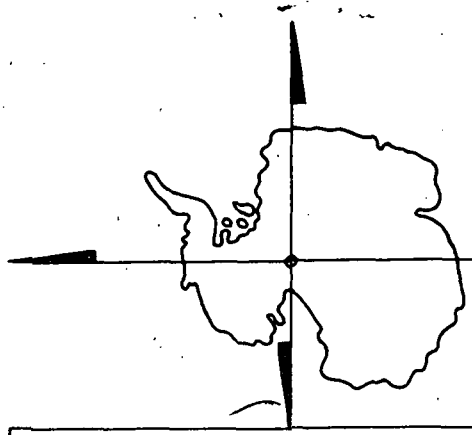
DAA / JOHNSON



Antarctic Meteorite NEWSLETTER

A periodical issued by the Antarctic Meteorite Working Group to inform scientists of the basic characteristics of specimens recovered in the Antarctic.

Volume 9, Number 2 June 1986

Supported by the National Science Foundation, Division of Polar Programs, and compiled at Code SN2, Johnson Space Center, NASA, Houston, Texas 77058

!!!!!!!! SAMPLE REQUEST DEADLINE: OCTOBER 20, 1986 (SEE PAGE 2) !!!!!!!!

(NASA-TM-88774) ANTARCTIC METEORITE NEWSLETTER, VOLUME 9, NO. 2 (NASA) 31 p CSCL 03B

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SAMPLE-REQUEST GUIDELINES

All sample requests should be made in writing to

Secretary, MWG
SN2/Planetary Materials Branch
NASA/Johnson Space Center
Houston, TX 77058 USA.

Questions pertaining to sample requests can be directed in writing to the above address or can be directed by telephone to (713) 483-3274.

Requests for samples are welcomed from research scientists of all countries, regardless of their current state of funding for meteorite studies. All sample requests will be reviewed by the Meteorite Working Group (MWG), a peer-review committee that guides the collection, curation, allocation, and distribution of the U. S. Antarctic meteorites. Issuance of samples does not imply a commitment by any agency to fund the proposed research. Requests for financial support must be submitted separately to the appropriate funding agencies. As a matter of policy, U. S. Antarctic meteorites are the property of the National Science Foundation and all allocations are subject to recall.

Each request should refer to meteorite samples by their respective identification numbers and should provide detailed scientific justification for the proposed research. Specific requirements for samples, such as sizes or weights, particular locations (if applicable) within individual specimens, or special handling or shipping procedures should be explained in each request. All necessary information should probably be condensable into a one- or two-page letter, although informative attachments (reprints of publications that explain rationale, flow diagrams for analyses, etc.) are welcome.

Requests that are received by the MWG Secretary before October 20, 1986 will be reviewed at the MWG meeting of October 23-25, 1986 to be held in Washington, DC. Requests that are received after the October 20 deadline may possibly be delayed for review until the MWG meets again in the spring of 1987. PLEASE SUBMIT YOUR REQUESTS ON TIME.

Samples can be requested from any meteorite that has been made available through anouncement in any issue of the Antarctic Meteorite Newsletter (beginning with 1(1) in June, 1978). Many of the meteorites have also been described in the following catalogs:

Marvin, U. B. and B. Mason (eds.) (1984) Field and Laboratory Investigations of Meteorites from Victoria Land, Antarctica, Smithsonian Contr. Earth Sci. No. 26, Smithsonian Institution Press, 134 pp.

Marvin, U. B. and B. Mason (eds.) (1982) Catalog of Meteorites from Victoria Land, Antarctica, 1978-1980, Smithsonian Contr. Earth Sci. No. 24, Smithsonian Institution Press, 97 pp.

Marvin, U. B. and B. Mason (eds.) (1980) Catalog of Antarctic Meteorites, 1977-1978, Smithsonian Contr. Earth Sci. No. 23, Smithsonian Institution Press, 50 pp.

EDITOR'S OVERVIEW

James L. Gooding

A NEWSLETTER IN JUNE?

Yes! So many classification data have accumulated that the time between the appearance of issues 9(1) (February 1986) and 9(2) (this issue) was reduced in order to maintain our policy of timely distribution of the latest information. Issue 9(3) will appear in September 1986.

Readers of this Newsletter have become accustomed to seeing two issues each year: one in the spring and one in the fall. By design, each issue has been published so that each recipient has a copy in hand approximately one month before a scheduled meeting of the Meteorite Working Group and can prepare sample requests in time for review by MWG. The system has worked well because the one-month lead time seems to be sufficient for researchers to formulate their sample requests but not so long that the Newsletter information becomes "cold" (and sample requestors forget to act) before the MWG meeting. As noted on page 3, the next MWG meeting will be in October 1986 although sample requests can be submitted at any time. Rather than let this issue become "cold," please feel free to submit, at your earliest opportunity, requests for samples of meteorites announced in this issue.

"NEW" 1978 PEBBLES INCLUDE A UREILITE

In 1980, several research groups agreed to share the workload in classifying numerous "pebble-sized" (< 150 g) meteorite specimens that were collected in 1978. For most specimens, results of those independent classification projects were published in earlier issues of this Newsletter and in the open literature. In this issue, data are presented in Table 1 for the last of the 1978 pebbles, for which classification was undertaken in 1980 by Dr. J. M. Rhodes. We thank Dr. B. H. Mason for helping complete the work.

Please note that one of the pebbles, META78008, is an unusual ureilite. Refer to the description of the rock (p. 19) for more details.

NEW METEORITES FROM 1983-1984 COLLECTIONS

Pages 7-19 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 9(1) (February 1986). Most large (> 150-g) specimens (regardless of petrologic type) and all "pebble"-sized (< 150-g) specimens of special petrologic type (i.e., carbonaceous chondrite, unequilibrated ordinary chondrite, achondrite, stony-iron or iron) are represented by separate descriptions. However, specimens of non-special petrologic type (i.e., equilibrated ordinary chondrite) are listed only as single-line entries in Table 2. For convenience, new specimens are also recast by petrologic type in Table 3.

Each "macroscopic" description summarizes features that were visible to the eye (with, at most, the aid of a binocular stereomicroscope) at the time the meteorite was first examined. Macroscopic descriptions of stony meteorites were performed at NASA/JSC. Each "thin section" description represents

features that were found in a survey-level examination of a polished section that was prepared from a small (usually exterior) chip of the meteorite. Classification is based on microscopic petrography and reconnaissance-level electron-probe microanalyses. For each stony meteorite, the sample number assigned to the preliminary examination section (...,1 or ...,3, etc.) is included as an aid to workers who may later wish to intercompare samples from different locations in the meteorite. Exceptions to that rule occur for descriptions of several specimens that are thought to be members of a single fall. In those cases, a single microscopic description was based on several different thin sections.

Note that Tables 4-6 contain physical data for individual specimens in each of three provisionally suggested pairing groups. Reference to the appropriate table is made in the corresponding petrographic description.

Meteorite descriptions contained in this issue were contributed by the following individuals:

Mrs. Carol Schwarz, Ms. Roberta Score, and Mr. Rene' Martinez
Planetary Materials Laboratory
(NASA/Johnson Space Center)
Northrop Services, Inc.
Houston, Texas

Dr. Brian H. Mason
Department of Mineral Sciences
U. S. National Museum of Natural History
Smithsonian Institution
Washington, DC.

INCLUSIONS IN ALH83100 AND MORE PIECES OF ALH83102 (C2 CHONDRITES)

Although meteorite ALH83100 was formally defined as three fragmented stones, numerous other specimens that were thought to be fragments of the same fall were also collected by the field party. Processing of the many small specimens was recently completed and the resultant physical data are summarized in Table 7. Several of the small specimens show dark inclusions and chondrules that stand in relief on weathered surfaces. Either ALH83100 is more complex than first thought or many of those small carbonaceous-chondrite fragments represent separate meteorites. A detailed study of the special fragments noted in Table 7 should be performed to resolve this issue.

As was the case for ALH83100, numerous fragments thought to be paired with ALH83102 were also collected and are summarized in Table 8. Small specimens that were thought to be paired with ALH83102 did not differ significantly in macroscopic appearance from the larger specimen.

COMPREHENSIVE PAIRING DATA

Issue 8(2) summarized possible pairings among meteorites in the U. S. Antarctic collections using a table compiled by Dr. Edward R. D. Scott (Institute of Meteoritics, University of New Mexico, Albuquerque, NM 87131 USA). Ed has updated his data base and has provided the information that is printed here as Tables 9 and 10 and the accompanying references. In addition, Ed provided the following preface:

> These pairing lists include all proposed pairings for Victoria Land and Thiel Mountain specimens. Table 9 gives the specimens in pairing groups and Table 10 lists all these specimens in alphabetical order. Estimates of confidence levels are given:
>
> a = probably paired
>
> b = possibly paired
>
> c = tentatively paired
>
> x = unpaired or highly uncertain pairing.
>
> Table 9 includes from one to five references for each group of paired specimens; additional references are given by Scott (1984). Where possible, references are placed opposite the specimens to which they refer, but in some cases, a paper may refer to specimens on different lines of the same pairing group.
>
> The pairing lists are far from complete. For many of the rarer meteorite types, it is likely that most of the paired specimens have been identified. By contrast, for types 4-6 ordinary chondrites, it is certain that most of the paired specimens have not been recognized.

Note that pairings suggested in Table 1 have not yet been tested by other methods and, therefore, do not appear in Ed's Tables 9 and 10.

ARTICLE BY MIKE LIPSCHUTZ

Each copy of this issue was mailed with a companion copy of the following article:

> Lipschutz, Michael E. (1985) Unique meteorites attract researchers, Geotimes (November 1985), p. 8-10.

Mike's article briefly summarizes major aspects of the collection and study of Antarctic meteorites and is aimed at the general geoscience-oriented audience. Thanks are due to the Lunar and Planetary Institute for covering the cost of reprints.

A few previous issues of the Newsletter have also been accompanied by other excellent, general-interest articles on Antarctic meteorites such as those written by Ursula Marvin, Bill Cassidy, and Lou Rancitelli. Authors of similar articles who would like to make general distributions of reprints are invited to contact the Editor to discuss details.

Table 1.

List of Newly Classified Antarctic Meteorites from the 1978 Collection

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
BTNA78005 *	81.8	H-6 CHONDRITE	B	B	18	16
META78004	30.3	L-6 CHONDRITE	B	A		
META78008 *	125.5	UREILITE	B	B	22	13
META78009	28.8	H-5 CHONDRITE	B	A		
META78011 *	115.7	H-5 CHONDRITE	C	A	17	15
META78012 * $	86.3	H-5 CHONDRITE	B	B	17	16
META78013 $	131.9	H-6 CHONDRITE	B	B		
META78014	100.5	H-6 CHONDRITE	C	A		
META78015	36.8	L-5 CHONDRITE	B	A		
META78016 $	114.1	H-6 CHONDRITE	B/C	B		
META78017 * $	46.9	H-6 CHONDRITE	B/C	A	18	16
META78018	81.9	H-5 CHONDRITE	B	A		
META78019 $	91.1	H-6 CHONDRITE	A/B	B		
META78020 *	63.7	H-6 CHONDRITE	C	A	18	16
META78021	22.6	L-6 CHONDRITE	B/C	B		
META78022 $	48.5	H-6 CHONDRITE	B/C	A		
META78023 *	55.6	H-6 CHONDRITE	B	A	18	16
META78024	22.2	H-6 CHONDRITE	B/C	B		
META78025	58.2	H-6 CHONDRITE	C	B/C		
META78026 *	75.2	H-6 CHONDRITE	C	A	18	15
META78027 * $	52.5	H-6 CHONDRITE	B	B	18	16
RKPA78005	28.7	H-5 CHONDRITE	B	B		

* Classification by B. H. Mason (Smithsonian Institution).
Other classifications by S. E. Haggerty and J. M. Rhodes (University of Massachusetts).

$ Possibly paired with META78012, based on macroscopic observations by R. Score.

Table 2.

List of Newly Classified Antarctic Meteorites

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
ALH 83002	367.1	L-5 CHONDRITE	B	A	23	19
ALH 83003	321.8	H-5 CHONDRITE	A/B	A	17	15
ALH 83004	813.9	L-6 CHONDRITE	B	A	23	19
ALH 83005	227.9	H-5 CHONDRITE	C	B	17	15
ALH 83006	230.2	H-5 CHONDRITE	B/C	C	17	15
EET 83240	247.8	L-5 CHONDRITE	B	A/B	23	20
EET 83260	15.4	L-3 CHONDRITE	B/C	A	7-19	5-25
EET 83262	23.9	H-5 CHONDRITE	A	A	17	16
EET 83267	27.7	H-3 CHONDRITE	B	C	13-23	12-20
EET 83269	8.5	L-5 CHONDRITE	A/B	A/B	23	19
EET 83271	67.3	L-6 CHONDRITE	A/B	A	24	21
EET 83274	82.7	L-3 CHONDRITE	B	A	5-28	5-15
EET 83276	48.9	L-6 CHONDRITE	B	B	24	20
EET 83376	79.3	HOWARDITE	A/B	A/B		21-49
ALH 84002	7554.0	L-6 CHONDRITE	B	A/B	24	20
ALH 84003	3088.7	H-5 CHONDRITE	A/B	A	16	15
ALH 84009	335.6	AUBRITE	A	A	0	0
ALH 84010	303.0	AUBRITE	A	B	0	0
ALH 84012	224.7	AUBRITE	A	A	0	0
ALH 84013	159.9	AUBRITE	A/B	A/B	0	0
ALH 84014	49.4	AUBRITE	A/B	A/B	0	0
ALH 84015	263.9	AUBRITE	A	B	0	0
ALH 84016	149.7	AUBRITE	A	A	0	0
ALH 84017	79.8	AUBRITE	A	B/C	0	0
ALH 84018	81.7	AUBRITE	A	B	0	0
ALH 84019	93.2	AUBRITE	A	A/B	0	0
ALH 84020	191.1	AUBRITE	A/B	A	0	0
ALH 84021	35.7	AUBRITE	A	C	0	0
ALH 84022	12.5	AUBRITE	A	A	0	0
ALH 84023	262.4	AUBRITE	A	A	0	0
ALH 84024	194.4	AUBRITE	A	A	0	0
ALH 84035	3.2	CARBONACEOUS C2	A	A	0.5-6	0.7-7
ALH 84036	2.8	CARBONACEOUS C2	A	A	0.7-40	2-13
ALH 84037	3.0	CARBONACEOUS C3V	B	A	0.8-9	0.5-12
ALH 84038	12.3	CARBONACEOUS C4	A	A	25-30	
ALH 84039	32.8	CARBONACEOUS C2	A/B	A	0.4-31	.8-1.5
ALH 84040	28.7	CARBONACEOUS C2	A	B		
ALH 84041	1.3	CARBONACEOUS C2	A	B		
ALH 84043	16.8	CARBONACEOUS C2	A	B		
ALH 84045	11.4	CARBONACEOUS C2	A	A/B		
ALH 84046	1.5	CARBONACEOUS C2	A	A	.3-2.1	.7-1.0
ALH 84047	4.4	CARBONACEOUS C2	A/B	B		
ALH 84048	12.6	CARBONACEOUS C2	A	B		
ALH 84049	29.4	CARBONACEOUS C2	A	B		
ALH 84050	3.2	CARBONACEOUS C2	A	B		
ALH 84051	34.3	CARBONACEOUS C2	A/B	B		

Table 2 (continued).

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
ALH 84052	10.5	LL-6 CHONDRITE	A/B	A	29	24
ALH 84053	5.2	CARBONACEOUS C2	A	A	.5-1.5	5
ALH 84054	19.4	CARBONACEOUS C2	A	A	.5-36	3
ALH 84065	1641.7	L-6 CHONDRITE	A/B	A	23	20
ALH 84069	1136.3	H-5 CHONDRITE	A	A	19	16

Table 3.

Achondrites

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
ALH 84009	335.6	AUBRITE	A	A	0	0
ALH 84010	303.0	AUBRITE	A	B	0	0
ALH 84012	224.7	AUBRITE	A	A	0	0
ALH 84013	159.9	AUBRITE	A/B	A/B	0	0
ALH 84014	49.4	AUBRITE	A/B	A/B	0	0
ALH 84015	263.9	AUBRITE	A	B	0	0
ALH 84016	149.7	AUBRITE	A	A	0	0
ALH 84017	79.8	AUBRITE	A	B/C	0	0
ALH 84018	81.7	AUBRITE	A	B	0	0
ALH 84019	93.2	AUBRITE	A	A/B	0	0
ALH 84020	191.1	AUBRITE	A/B	A	0	0
ALH 84021	35.7	AUBRITE	A	C	0	0
ALH 84022	12.5	AUBRITE	A	A	0	0
ALH 84023	262.4	AUBRITE	A	A	0	0
ALH 84024	194.4	AUBRITE	A	A	0	0
EET 83376	79.3	HOWARDITE	A/B	A/B		21-49
META78008	125.5	UREILITE	B	B	22	13

Carbonaceous Chondrites

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
ALH 84035	3.2	CARBONACEOUS C2	A	A	0.5-6	0.7-7
ALH 84036	2.8	CARBONACEOUS C2	A	A	0.7-40	2-13
ALH 84039	32.8	CARBONACEOUS C2	A/B	A	0.4-31	.8-1.5
ALH 84040	28.7	CARBONACEOUS C2	A	B		
ALH 84041	1.3	CARBONACEOUS C2	A	B		
ALH 84043	16.8	CARBONACEOUS C2	A	B		
ALH 84045	11.4	CARBONACEOUS C2	A	A/B		
ALH 84046	1.5	CARBONACEOUS C2	A	A	.3-2.1	.7-1.0
ALH 84047	4.4	CARBONACEOUS C2	A/B	B		
ALH 84048	12.6	CARBONACEOUS C2	A	B		
ALH 84049	29.4	CARBONACEOUS C2	A	B		
ALH 84050	3.2	CARBONACEOUS C2	A	B		
ALH 84051	34.3	CARBONACEOUS C2	A/B	B		
ALH 84053	5.2	CARBONACEOUS C2	A	A	.5-1.5	5
ALH 84054	19.4	CARBONACEOUS C2	A	A	.5-36	3
ALH 84037	3.0	CARBONACEOUS C3V	B	A	0.8-9	0.5-12
ALH 84038	12.3	CARBONACEOUS C4	A	A	25-30	

Table 3 (continued).

Chondrites - Type 3

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
EET 83267	27.7	H-3 CHONDRITE	B	C	13-23	12-20
EET 83260	15.4	L-3 CHONDRITE	B/C	A	7-19	5-25
EET 83274	82.7	L-3 CHONDRITE	B	A	5-28	5-15

Table 4.

New specimens tentatively paired with ALH83009 (Aubrite), based on preliminary examination data.

Sample Number	Weight (g)	Dimension (cm)	Field Number
ALH84009	355.6	8.5 x 5.5 x 6	2556
ALH84010	303.0	9 x 5.5 x 3	1456
ALH84012	224.7	6 x 4 x 5	2836
ALH84013	159.9	8 x 4 x 6	2569
ALH84014	49.4	4 x 3 x 3	2847
ALH84015	263.9	8.5 x 5 x 4	2541
ALH84016	149.7	6 x 6 x 2	2846
ALH84017	79.8	6 x 2.5 x 3	2529
ALH84018	81.7	4.5 x 3.5 x 3	2856
ALH84019	93.2	4.5 x 4 x 3.5	1540
ALH84020	191.1	6 x 4 x 4	2838
ALH84021	35.7	<1.5 cm fragments	2510
ALH84022	12.5	2 x 2 x 3	2588
ALH84023	262.4	6 x 4 x 5	2869
ALH84024	194.4	5 x 5 x 4	2839

Table 5.

New specimens tentatively paired with ALH83100 or ALH83102 (C2 Chondrite), based on preliminary examination data.

Sample Number	Weight (g)	Dimension (cm)	Field Number
ALH84035	3.2	<1 cm fragments	2513
ALH84040	28.7	5 x 3 x 2	2052
ALH84041	1.3	1.6 x .8 x 1	1542
ALH84043	16.8	4.5 x 2 x 1.5	2007
ALH84045	11.4	3 x 2.5 x 1.5	2079
ALH84047	4.4	2.5 x 2 x .8 1 x 1.5 x .8	2041
ALH84048	12.6	3.5 x 2.5 x 2	2097
ALH84049	29.4	4.5 x 2.5 x 2	2060
ALH84051	34.3	4 x 3.5 x 2.5	2070

Table 6.

New specimens tentatively paired with ALH84033 (C2 Chondrite), based on preliminary examination data.

Sample Number	Weight (g)	Dimension (cm)	Field Number
ALH84036	2.8	2 x 1.8 x 1	2042
ALH84039	32.8	4.5 x 4 x 2.5	2539
ALH84046	1.5	1.5 x 1.5 x .6	1455
ALH84050	3.2	1.8 x 1.5 x 1	2511
ALH84053	5.2	<1 cm fragments	2017
ALH84054	19.4	3 x 3 x 2	2426

Table 7.

Newly processed specimens of ALH83100 (C2 Chondrite)
(compiled by Carol Schwarz).

Split	Weight (g)	Special Macroscopic Features *	Split	Weight (g)	Special Macroscopic Features *
13	98.030		40	56.750	
14	136.800		41	11.530	B.
15	47.500		42	10.960	
16	74.500		43	6.250	
17	59.300		44	7.480	
18	98.900		45	5.990	
19	98.200		46	2.120	
20	109.800		47	2.530	
21	97.000		48	18.390	
22	96.100		49	26.220	C.
23	60.010		50	19.020	
24	5.220		51	8.090	
25	71.000		52	13.290	
26	20.750		53	66.620	D.
27	13.740		54	45.230	
28	8.180		55	27.970	
29	23.400	A.	56	27.140	
30	13.440		57	28.800	
31	1.240		58	55.090	
32	5.140		59	21.850	
33	73.860		60	19.130	
34	7.870		61	121.020	E.
35	10.750		62	63.140	
36	9.140		63	97.640	
37	26.910		64	71.810	F.
38	4.630		65	39.720	
39	11.210	B.			

*
A. Weathered 6-mm clast/chondrule surrounded by radiating fractures.
B. 4-5 mm dark clast/chondrule.
C. 5 x 3 cm dark clast and several 1-mm chondrules.
D. 8 x 5 mm fractured retangular-shaped dark inclusion.
E. Several 3-5 mm dark clasts/chondrules.
F. 5-mm diameter distinct dark clast/chondrule and many <1-mm chondrules.

Table 8.

Newly processed specimens of ALH83102 (C2 Chondrite)
(compiled by Carol Schwarz).

SPLIT	WEIGHT (g)	SPLIT	WEIGHT (g)
3	99.710	12	3.530
4	75.150	13	44.650
5	21.390	14	4.080
6	25.340	15	18.280
7	66.760	16	1.290
8	14.560	17	1.160
9	16.580	18	1.100
10	70.570	19	23.760
11	36.900	20	20.560

Sample Nos.: ALH84009, 010, 012, 013, 014, 015, 016, 017, 018, 019, 020, 021, 022, 024 Location: Allan Hills

Meteorite Type: Aubrite

See Table 4 for weights, dimensions, and field numbers.

Macroscopic Description: Rene' Martinez
Most of these aubrites have thin patchy brown to yellow fusion crust. All specimens are slightly weathered. Enstatite clasts are as large as 3.5 cm and as small as 1 mm. The clast population ranges from sparse to dense for the different specimens. Dark aphanitic inclusions and metallic inclusions surrounded by oxidation haloes are both common.

Thin Section Description: Brian Mason
Polished thin sections of these specimens show that they are aubrites, and can confidently be paired with ALH84007, 008, and 011 (described in Antarctic Meteorite Newsletter 8(2), and probably with ALH83009 and 015, collected in the same area (Middle Western Icefield). They consist almost entirely of iron-free enstatite, with rare plagioclase (An7-10), forsterite (usually iron-free, but up to Fa9), and iron-free diopside (Wo42). Small amounts of opaque minerals are present; these include troilite, oldhamite, alabandite, daubreelite, and nickel-iron.

Visual inspection of chips of ALH84014, 015, 018, 019, 020, 021, and 022 show that these are also aubrites, probably pieces of the same meteorite.

Sample Nos.: ALH84035, 040, 041, 043, 045, 047, 048, 049, 051 Location: Allan Hills

Meteorite Type: C2 Chondrite

See Table 5 for weights, dimensions, and field numbers.

Macroscopic Description: Carol Schwarz
These carbonaceous chondrite fragments are all fine-grained and black in color. Some of the fragments contain small white inclusions. Salt deposit has formed on most of them.

Thin Section Description: Brian Mason
These meteorites are C2 chondrites characterized by almost complete serpentinization and can confidently be paired with ALH84029, 030, 031, 032, 034, 042, and 044 (Antarctic Meteorite Newsletter 8(2)); ALH83100 and 83102 are very similar. The major component is a brown to black phyllosilicate matrix enclosing green to pale brown phyllosilicate pseudomorphs of chondrules, inclusions, and mineral grains. Minute grains of calcite are common. Rare grains of forsteritic olivine and clinoenstatite may be present.

Sample Nos.: ALH84036, 039, 046, 050, 053, 054 Location: Allan Hills

Meteorite Type: C2 Chondrite

See Table 6 for weights, dimensions, and field numbers.

Macroscopic Description: Carol Schwarz
Some of these specimens have pitted and fractured fusion crust while some have no fusion crust remaining. The interior of all of these is black with numerous clasts/chondrules that are <0.5 mm in longest dimension. Oxidation is present but minimal. Evaporite deposit has formed on ALH84050 and 054.

Thin Section Description: Brian Mason
Thin sections of all these C2 chondrites are so similar that they can be described as a group, and the possibility of pairing should be considered. ALH84033 (Antarctic Meteorite Newsletter 8(2)) is also similar. Olivine-rich chondrules up to 2 mm diameter, chondrule fragments, and irregular olivine-rich inclusions up to 1.5 mm across are present in a black to translucent brown matrix with many small mineral grains. Most of the olivine is near forsterite in composition, but occasional iron-rich grains (up to Fa40) were analysed. Pyroxene is not common, and is polysynthetically-twinned clionoenstatite. Refractory inclusions up to 0.15-0.2 mm in size, and containing spinel + perovskite + hibonite, are common. Blue pleochroic hibonite is present in only a few inclusions in 036, 039, 046, and 054.

Sample No.: ALH84037 Location: Allan Hills
Weight (g): 3.0 Field No.: 2868
Dimensions (cm): 1.5 x 1.3 x 1

Meteorite Type: C3V Chondrite

Macroscopic Description: Carol Schwarz
This fragment has rusty (and in places, shiny) fusion crust on one surface. Broken surfaces are black and rough with abundant weathering. Evaporite deposit is present on both interior and exterior surfaces. The interior is dark gray to reddish from oxidation. Millimeter-sized lighter colored clasts/chondrules were noted.

Thin Section (,2) Description: Brian Mason
The small section (5 mm across) shows ameboid chondrules and irregular inclusions up to 2 mm in maximum dimension set in a small amount of translucent brown isotropic matrix. The chondrules and inclusions consist of granular olivine with minor amounts of polysynthetically twinned clinopyroxene. Microprobe analyses give the following compositions: olivine, Fa0.8-9, mean Fa4 (CV Fe067); pyroxene, Fs0.5-12. The meteorite is a C3V chondrite and is so similar to ALH84028 that it can confidently be paired with it.

Sample No.: ALH84038 Location: Allan Hills
Weight (g): 12.3 Field No.: 2468
Dimensions (cm): 2 x 2.3 x 1.5

Meteorite Type: C4 Chondrite

Macroscopic Description: Carol Schwarz
This carbonaceous chondrite fragment has black to reddish fusion crust on all but one surface. The interior is dark gray and fine-grained with no features visible. Some white evaporite deposit was exposed.

Thin Section (,3) Description: Brian Mason
The section consists largely of finely granular olivine (grains ranging up to 0.1 mm) with rare chondrules and chondrule fragments, and a little opaque material. Microprobe analyses gave the following compositions: olivine, Fa25-30 (one grain Fa39), mean Fa28; pyroxene and plagioclase may be present in small amounts, but were not found with the probe. The meteorite is classified as a C4 chondrite. It is very similar to ALH82135 and the possibility of pairing should be considered.

Sample No.: ALH84052 Location: Allan Hills
Weight (g): 10.5 Field No.: 1452
Dimensions (cm): 2.5 x 1.8 x 1.8

Meteorite Type: LL6 Chondrite

Macroscopic Description: Carol Schwarz
Black to slightly reddish-brown fusion crust covers 50% of this pebble. The remainder of its surface is black. No features are visible in the black interior except for some metal(?) flecks and reddish-brown staining.

Thin Section (,3) Description: Brian Mason
Chondritic structure is barely perceptible, being represented by a few chondrule fragments in a granular matrix consisting largely of olivine and pyroxene; small amounts of nickel-iron and troilite are present as widely dispersed tiny grains, possibly a shock effect. The texture suggests an aggregate of microclasts. Microprobe analyses give the following compositions: olivine, Fa29; pyroxene, Fs24; plagioclase, An11. The meteorite is classified as an LL6 chondrite.

Sample No.: EET83260 Location: Elephant Moraine
Weight (g): 15.4 Field No.: 2997
Dimensions (cm): 3 x 2 x 2

Meteorite Type: L3 Chondrite

Macroscopic Description: Rene' Martinez
This specimen retains fusion crust on all sides which is iridescent and fractured in some areas. The interior is very dark gray with abundant small white inclusions. Sample is very coherent.

Thin Section (,3) Description: Brian Mason
The section shows a close-packed aggregate of chondrules and chondrule fragments, with some black matrix and minor amounts of troilite and nickel-iron. The chondrules are fairly uniform in size, 0.3-1.2 mm across, and show a variety of types. Considerable weathering is indicated by areas of red-brown limonite throughout the section. Remnants of fusion crust are present. Microprobe analyses give the following compositions: olivine, Fa7-19, mean Fa17 (CV FeO22); pyroxene, Fs5-25. The variability of olivine and pyroxene compositions indicates type 3, and the amount of nickel-iron suggests L group: hence, the meteorite is tentatively classified as an L3 chondrite.

Sample No.: EET83267 Location: Elephant Moraine
Weight (g): 27.7 Field No.: 2736
Dimensions (cm): 3 x 3 x 2

Meteorite Type: H3 Chondrite

Macroscopic Description: Rene' Martinez
Pitted and weathered fusion crust covers most of this sample. The interior is light gray with abundant chondrules visible.

Thin Section (,3) Description: Brian Mason
The meteorite is a close-packed aggregate of chondrules, chondrule fragments, and mineral grains, the latter including a moderate amount of nickel-iron and a smaller amount of troilite. Chondrules range from 0.3 to 1.8 mm in diameter and exhibit a variety of types. Fusion crust is present along one edge. The meteorite appears to be relatively unweathered. Microprobe analyses give the following compositions: olivine, Fa13-23, mean Fa18 (CV FeO13); pyroxene, Fs12-20, mean 18. The variability in olivine and pyroxene compositions indicates type 3, and the amount of metal H group; the meteorite is therefore classified as an H3 chondrite.

Sample No.: EET83274 Location: Elephant Moraine
Weight (g): 82.7 Field No.: 2880
Dimensions (cm): 5.5 x 4 x 3

Meteorite Type: L3 Chondrite

Macroscopic Description: Carol Schwarz
No fusion crust remains on this gray-green rounded specimen. Numerous clasts/chondrules, 1-6 mm in diameter, are present on the surface. The interior is mostly reddish-brown with some areas being black and fine-grained. EET83274 is a very coherent specimen.

Thin Section (,3) Description: Brian Mason
The section shows a close-packed aggregate of chondrules and chondrule fragments, with a small amount of interstitial material; this includes small amounts of nickel-iron and troilite. Chondrules range from 0.6 to 3 mm across, and exhibit a variety of types. Extensive weathering is indicated by areas of red-brown limonite throughout the section. Microprobe analyses give the following compositions: olivine, Fa5-28, mean Fa18 (CV Fe035); pyroxene, Fs5-15. The variability of olivine and pyroxene compositions indicates type 3, and the amount of metal suggests L group; the meteorite is therefore tentatively classified as an L3 chondrite.

Sample No.: EET83376 Location: Elephant Moraine
Weight (g): 79.3 Field No.: 1346
Dimensions (cm): 6.5 x 3.5 x 3

Meteorite Type: Howardite

Macroscopic Description: Roberta Score
One quarter of this achondrite fragment is covered with black fusion crust. The exterior surfaces are darker gray than the interior surfaces. This feature extends approximately 3 mm into the interior as a weathering rind. Few small clasts were noted.

Thin Section (,3) Description: Brian Mason
The meteorite is a microbreccia with a wide variety of rock and mineral clasts. The rock clasts range up to 3 mm across, and include gabbroic, anorthositic, and orthopyroxenitic varieties. Mineral grains are mainly plagioclase, orthopyroxene, and pigeonite, with rare opaques. Microprobe analyses give the following compositions: pyroxene, Wo1-22, En29-78, Fs21-49; plagioclase, An80-96. The meteorite is a pyroxene-plagioclase achondrite, and the presence of orthopyroxene of diogenitic composition indicates that it can be classified as a howardite. It is possibly paired with other EET howardites.

Sample No.: META78008 Location: Meteorite Hills
Weight (g): 125.5 Field No.: 342
Dimensions (cm): 6 x 4.5 x 3.5

Meteorite Type: Ureilite

Macroscopic Description: Roberta Score
Two-thirds of this acondrite is covered with frothy black fusion crust that is iridescent in some areas. The surface devoid of fusion crust is a fracture surface which has weathered to a reddish-brown color. Several cracks penetrate the sample. The exposed interior shows abundant well-defined crystal faces. Weathering of this stone is moderate. The overall interior color is dark brown to reddish-brown.

Thin Section (,6) Description: Brian Mason
The section shows an aggregate of anhedral olivine and pyroxene grains (1-2 mm across), rimmed by opaque limonitic and carbonaceous material. Microprobe analyses give the following compositions: olivine, Fa22 (CaO 0.26%); pyroxene, Wo27Fs13 (with Al_2O_3 3.2%, Na_2O 0.62%, MnO 0.46%, TiO_2 0.25%). The meteorite is a ureilite, but is almost unique in having augite as the pyroxene component; the only comparable ureilite is Yamato 74130 (Takeda et al., Mem. Natl, Inst. Polar Research, Tokyo, Special Issue No. 15, p. 54, 1979).

Table 9. Meteorite specimens that have been paired and the confidence levels of these pairings.

Pair Number	Specimens	Confidence Level	References
UNGROUPED METEORITES			
1.1	ALHA77081, 81261, 81315	a	Mason, 1985
EUCRITES AND HOWARDITES			
2.1	ALHA76005, 77302, 78040, 78132, 78158, 78165, 79017, 81009	a	Score et al., 1982b Schultz, 1985
	80102, 81006-81008, 81010, 81012	b	Delaney et al., 1984
	81001	c	Delaney, 1986
2.2a	EETA79004, 79011, 83228, 83229, 83231, 83232, 83234, 83251, 83283	b	Delaney et al., 1984 Delaney, 1986
2.2b	EETA79005, 79006, 82600, 83227, 83235	b	Delaney et al., 1984; Delaney, 1986
Alternative view			
2.2a	EET 83231, 83232	a	Mason, 1986b
	79004	b	
2.2b	EETA79011, 83229, 83234, 83283	c	Mason, 1986b
2.2c	EETA79005, 79006, 82600, 83212, 83227, 83228, 83235, 83251	c	Mason, 1986b
AUBRITES			
3.1	ALH 83009, 83015, 84007-84024	a	Delaney, 1985; Mason, 1986b,c MacPherson 1985b;
3.2	EET 83246, 83247	x	B. Mason, (unpub. data)
UREILITES			
3.4	ALHA78019, 78262	c	Score et al., 1981, 1982b; Berkley and Jones, 1982
3.5	ALH 82106, 82130	a	Mason, 1984b
MESOSIDERITES			
4.1	ALHA77219, 81059, 81098	b	Mason, 1983a,b
4.2	RKPA79015, 80229, 80246, 80258, 80263	b	Clarke and Mason, 1982
IRONS, GROUP IA			
5.1	ALHA76002, 77250, 77263, 77289, 77290	a	Clarke et al., 1980
	77283	x	Malvin et al., 1984
IRONS, GROUP IIB			
5.2	DRPA78001-78016	a	Clarke, 1982
CM2 CHONDRITES			
6.1	ALHA81002, 81004, 82100	b	McSween, 1986b
	78261, 82131, 83016	c	Mason, 1983a; McSween, 1986
	84033, 84036, 84039, 84046, 84050, 84053, 84054	b	Mason, 1986c
	77306	x	Score et al., 1982b

Pair Number	Specimens	Confidence Level	References
6.2	ALH 83100, 83102, 83106	b	Macpherson, 1985a,b
	84029-84032, 84034, 84035, 84040-84045, 84047-84049, 84051	a	Mason, 1986c
CO3 CHONDRITES			
6.3	ALHA77003, 83108	c	Mason, 1986a
	82101	x	Scott, 1984b; Wieler et al., 1985
CV3 CHONDRITES			
6.4	ALHA81003, 81258	c	Mason, 1985
6.5	ALH 84028, 84037	b	Mason, 1986c
C4 CHONDRITES			
6.6	ALH 82135, 84038	c	Mason, 1986c
EH3/4 CHONDRITES			
7.1	ALHA77156, 77295	a	McKinley and Keil, 1984;
	81189	x	Wieler et al., 1985; Scott, 1986
7.2	EET 83307, 83322	b	Mason, 1986a
E6 CHONDRITES			
7.2	ALHA81021, 81260	c	Mason, 1985
H4 CHONDRITES			
8.1	ALHA77004,77190-77192, 77208, 77223-77226, 77232, 77233	b	Cassidy, 1980
	77221	c	Scott, 1984b
8.2	ALHA77009, 81022	c	Score et al.,1984;Mason, 1983a
	78084	x	Scott,1984b;Sarafin et al.,1985
8.3	ALHA78193, 78196, 78223	b	Anonymous, 1981
8.4	ALHA80106, 80121, 80128, 80131	c	Mason and Clarke, 1982
8.5	ALHA81041, 81043-81052	c	Score, 1983; Mason, 1983b
8.6	RKPA80237, 80267	b	Mason and Clarke, 1982
	80232	x	Scott, 1984
H5 CHONDRITES			
9.1	ALHA77014, 77264	c	Cassidy, 1980
9.2	ALHA77021, 77025, 77061, 77062, 77064, 77071, 77074, 77086, 77088	c	Cassidy, 1980; Score et al., 1981
	77102	x	
9.3	ALHA77118, 77119, 77124	c	Cassidy, 1980
9.4	ALHA78209, 78221, 78225, 78227, 78233	b	Anonymous, 1981
9.5	ALHA79031, 79032	b	Score et al., 1981
9.6	ALHA80111, 80124, 80127, 80129, 80132	c	Mason and Clarke, 1982; Vogt et al., 1985
9.7	RKPA80217, 80218	c	Score et al., 1982a

Pair Number	Specimens	Confidence Level	References
9.8	RKPA80220, 80223	c	Score et al., 1982a
9.9	RKPA80250, 80251	c	Score et al., 1982a
9.10	TIL 82412, 82413	c	Mason, 1984b
9.11	TIL 82414, 82415	c	Mason, 1984b
H6 CHONDRITES			
10.1	ALHA77144, 7148	c	Cassidy, 1980
10.2	ALHA77271, 7288	a	Cassidy, 1980; Scott, 1984
10.3	ALHA78211, 78213, 78215, 78229, 78231	b	Anonymous, 1981
10.4	ALHA80122, 80126, 80130	c	Mason and Clarke,1982
10.5	ALHA81035, 81038, 81103, 81112	c	Mason, 1983a,b; Anonymous, 1984
10.6	MBRA76001, 76002	a	Weber and Schultz, 1980
10.7	RKPA80203, 80206, 80208, 80211, 80213, 80214, 80221, 80254, 80255, 80265, 80266	b	Mason and Clarke, 1982; Scott, 1984
	80231, 80262	c	
10.8	EET 82610, 82615	c	Mason, 1984b
10.9	PCA 82526, 82527	c	Mason, 1984b
L3 CHONDRITES			
11.1	ALHA77011, 77015, 77031, 77033, 77034, 77036, 77043, 77047, 77049, 77050, 77052, 77115, 77140, 77160, 77163-77167, 77170, 77175, 77178, 77185, 77211, 77214, 77241, 77244, 77249, 77260, 77303, 78013, 78015, 78017, 78037, 78038, 78041, 78162, 78170, 78176, 78180, 78186, 78188, 78235, 78236, 78238, 78239, 78243, 79001, 79045, 80133, 81025, 81030-81032, 81053, 81060, 81061, 81065, 81066, 81069, 81085, 81087, 81121, 81145, 81156, 81162, 81190, 81191, 81214, 81229, 81243, 81259, 81272, 81280 81292, 81299	a	McKinley et al., 1981; Scott, 1984, 1986; Nishiizumi et al., 1983; Wieler et al., 1985
11.2	ALHA77215-77217, 77252	a	Score, 1980; Nautiyal et al., 1982
11.3	RKPA79008, 80207	x	Wieler et al., 1985; Scott, 1986
11.4	ALHA78046, 83008	c	Mason, 1986b
L4 CHONDRITES			
12.1	RKPA80216, 80242	b	Score et al., 1982a
L5 CHONDRITES			
13.1	ALHA81018, 81023	c	Mason, 1983a
	81017	x	Marvin, 1986

Pair Number	Specimens	Confidence Level	References
13.2	PCA 82504, 82505	c	Mason, 1984a
13.3	RKPA80209, 80228, 80268	c	Mason and Clarke, 1982
L6 CHONDRITES			
14.1	ALHA76003, 76007	x	Weber and Schultz, 1980
14.2	ALHA77001, 77292, 77293, 77296, 77297	b	Cassidy, 1980
	77150, 77180, 77305	x	Anonymous, 1984; Scott 1984
14.3	ALHA77272, 77273	a	Cassidy, 1980
	77280, 77282	b	Goswami and Nishiizumi, 1983
	77231, 77269, 77270, 77277, 77281, 77284	x	Anonymous, 1984; Scott, 1984
14.4	ALHA78043, 78045	b	Score et al., 1981
14.5	ALHA78103, 78105	b	Anonymous, 1984
	78104, 78251	x	Scott, 1984
14.6	ALHA78112, 78114	x	Score et al., 1981; Nishiizumi et al., 1983
14.7	ALHA78126, 78130, 78131	x	Score et al., 1981; Scott, 1984
14.8	ALHA80101, 80103, 80105, 80107, 80108, 80110,	a	Score et al., 1982a;
	80112-80117, 80119, 80120, 80125		Mason and Clarke, 1982
	81017, 81107, 81262	b	Marvin, 1986
14.9	ALHA81027-81029	b	Mason, 1983a,b
14.10	BTNA78001, 78002	a	Score et al., 1981; R.Score, unpubl. data
14.11	EET 82605, 82606	c	Mason, 1984a
14.12	RKPA78001, 78003	b	Score et al., 1981
	79001, 79002, 80202, 80219, 80225, 80252,	c	Mason and Clarke, 1982;
	80261, 80264		Scott, 1984
LL3 CHONDRITES			
15.1	ALHA76004, 81251	b	Scott, 1984 Wieler et al., 1985
15.2	ALHA79003, 83007	c	Mason, 1986a
LL6 CHONDRITES			
16.1	RKPA80238, 80248	a	Mason and Clarke, 1982;
	80222	b	Sarafin and Herpers, 1983; Signer et al., 1983
16.2	ALHA78153, 81123, 83070	c	Mason, 1986a

*Confidence levels: a, high (>95%); b, medium (80-90%); c, low (50-75%); x, unpaired or highly uncertain pairing.

Table 10. Numerical list of meteorite specimens that have been paired and the confidence level of these pairings.

SPECIMEN NUMBER	PAIR NUMBER	CONFIDENCE* LEVEL	SPECIMEN NUMBER	PAIR NUMBER	CONFIDENCE* LEVEL
ALHA					
76002	5.1	a	77185	11.1	a
76003	14.1	x	77190-77192	8.1	b
76004	15.1	b	77208	8.1	b
76005	2.1	a	77211	11.1	a
76007	14.1	x	77214	11.1	a
77001	14.2	b	77215-77217	11.2	a
77003	6.3	c	77219	4.1	b
77004	8.1	b	77221	8.1	c
77009	8.2	c	77223-77226	8.1	b
77011	11.1	a	77231	14.3	x
77014	9.1	c	77232	8.1	b
77015	11.1	a	77233	8.1	b
77021	9.2	c	77241	11.1	a
77025	9.2	c	77244	11.1	a
77031	11.1	a	77249	11.1	a
77033	11.1	a	77250	5.1	a
77034	11.1	a	77252	11.2	a
77036	11.1	a	77260	11.1	a
77043	11.1	a	77263	5.1	a
77047	11.1	a	77264	9.1	c
77049	11.1	a	77269	14.3	x
77050	11.1	a	77270	14.3	x
77052	11.1	a	77271	10.2	a
77061	9.2	c	77272	14.3	a
77062	9.2	c	77273	14.3	a
77064	9.2	c	77277	14.3	x
77071	9.2	c	77280	14.3	b
77074	9.2	c	77281	14.3	x
77081	1.1	a	77282	14.3	b
77086	9.2	c	77283	5.1	x
77088	9.2	c	77284	14.3	x
77102	9.2	x	77288	10.2	a
77115	11.1	a	77289	5.1	a
77118	9.3	c	77290	5.1	a
77119	9.3	c	77292	14.2	b
77124	9.3	c	77293	14.2	b
77140	11.1	a	77295	7.1	a
77144	10.1	c	77296	14.2	b
77148	10.1	c	77297	14.2	b
77150	14.2	x	77302	2.1	a
77156	7.1	a	77303	11.1	a
77160	11.1	a	77305	14.2	x
77163-77167	11.1	a	77306	6.1	x
77170	11.1	a	78013	11.1	a
77175	11.1	a	78015	11.1	a
77178	11.1	a	78017	11.1	a
77180	14.2	x	78019	3.4	c

SPECIMEN NUMBER	PAIR NUMBER	CONFIDENCE* LEVEL	SPECIMEN NUMBER	PAIR NUMBER	CONFIDENCE* LEVEL
ALHA (continued)					
78037	11.1	a	80102	2.1	b
78038	11.1	a	80103	14.8	b
78040	2.1	a	80105	14.8	b
78041	11.1	a	80106	8.4	c
78043	14.4	b	80107	14.8	b
78045	14.4	b	80108	14.8	b
78046	11.4	c			
78084	8.2	x	80110	14.8	b
78103	14.5	b	80111	9.6	c
78104	14.5	x	80112-80117	14.8	b
78105	14.5	b	80119	14.8	b
78112	14.6	x	80120	14.8	b
78114	14.6	x	80121	8.4	c
78126	14.7	x	80122	10.4	c
78130	14.7	x	80124	9.6	c
78131	14.7	x	80125	14.8	b
78132	2.1	a	80126	10.4	c
78153	16.2	c	80127	9.6	c
78158	2.1	a	80128	8.4	c
78162	11.1	a	80129	9.6	c
78165	2.1	a	80130	10.4	c
78170	11.1	a	80131	8.4	c
78176	11.1	a	80132	9.6	c
78180	11.1	a	80133	11.1	a
78186	11.1	a	81001	2.1	b
78188	11.1	a	81002	6.1	b
78193	8.3	b	81003	6.4	c
78196	8.3	b	81004	6.1	b
78209	9.4	b	81006-81008	2.1	b
78211	10.3	b	81009	2.1	a
78213	10.3	b	81010	2.1	b
78215	10.3	b	81012	2.1	b
78221	9.4	b	81017	13.1	x
78223	8.3	b		14.8	b
78225	9.4	b	81018	13.1	c
78227	9.4	b	81021	7.2	c
78229	10.3	b	81022	8.2	c
78231	10.3	b	81023	13.1	c
78233	9.4	b	81025	11.1	a
78235	11.1	a	81027-81029	14.9	b
78236	11.1	a	81030-81032	11.1	a
78238	11.1	a	81035	10.5	c
78239	11.1	a	81038	10.5	c
78243	11.1	a	81041	8.5	c
78251	14.5	x	81043-81052	8.5	c
78261	6.1	c	81053	11.1	a
78262	3.4	c	81059	4.1	b
79001	11.1	a	81060	11.1	a
79003	15.2	c	81061	11.1	a
79017	2.1	a	81065	11.1	a
79031	9.5	b	81066	11.1	a
79032	9.5	b	81069	11.1	a
79045	11.1	a	81085	11.1	a
80101	14.8	b	81087	11.1	a

SPECIMEN NUMBER	PAIR NUMBER	CONFIDENCE* LEVEL	SPECIMEN NUMBER	PAIR NUMBER	CONFIDENCE* LEVEL
ALHA (continued)					
81098	4.1	b	84053	6.1	b
81103	10.5	c	84054	6.1	b
81107	14.8	b			
81112	10.5	c	BTNA		
81121	11.1	a	78001	14.10	a
81123	16.2	c	78002	14.10	a
81145	11.1	a			
81156	11.1	a	DRPA		
81162	11.1	a	78001-78016	5.2	a
81189	7.1	x			
81190	11.1	a	EETA		
81191	11.1	a	79004-79006	2.2	b
81214	11.1	a	79011	2.2	b
81229	11.1	a	82600	2.2	b
81243	11.1	a	82605	14.11	c
81251	15.1	b	82606	14.11	c
81258	6.4	c	82610	10.8	c
81259	11.1	a	82615	10.8	c
81260	7.2	c	83227-83229	2.2	b
81261	1.1	a	83231	2.2	b
81262	14.8	b	83232	2.2	b
81272	11.1	a	83234	2.2	b
81280	11.1	a	83235	2.2	b
81292	11.1	a	83246	3.2	x
81299	11.1	a	83247	3.2	x
81315	1.1	a	83251	2.2	b
82100	6.1	b	83283	2.2	b
82101	6.3	x	83307	7.2	b
82106	3.5	a	83322	7.2	b
82130	3.5	a			
82131	6.1	c	MBRA		
82135	6.6	c	76001	10.6	a
83007	15.2	c	76002	10.6	a
83008	11.4	c			
83009	3.1	a	PCA		
83015	3.1	a	82504	13.2	c
83016	6.1	c	82505	13.2	c
83070	16.2	c			
83100	6.2	b	82526	10.9	c
83102	6.2	b	82527	10.9	c
83106	6.2	b			
83108	6.3	c	RKPA		
84007-84024	3.1	a	78001	14.12	b
84028	6.5	b	78003	14.12	b
84029-84032	6.2	a	79001	14.12	c
84033	6.1	b	79002	14.12	c
84034	6.2	a	79008	11.3	x
84035	6.2	a	79015	4.2	b
84036	6.1	b	80202	14.12	c
84037	6.5	b	80203	10.7	b
84039	6.1	b	80206	10.7	b
84040-84045	6.2	a	80207	11.3	x
84046	6.1	b	80208	10.7	b
84050	6.1	b	80209	13.3	c

SPECIMEN NUMBER	PAIR NUMBER	CONFIDENCE* LEVEL	SPECIMEN NUMBER	PAIR NUMBER	CONFIDENCE* LEVEL
80211	10.7	b	80250	9.9	c
80213	10.7	b	80251	9.9	c
80214	10.7	b	80252	14.12	c
80216	12.1	b	80254	10.7	b
80217	9.7	c	80255	10.7	b
80218	9.7	c	80258	4.2	b
80219	14.12	c	80261	14.12	c
80220	9.8	c	80262	10.7	c
80221	10.7	b	80263	4.2	b
80222	16.1	b	80264	14.12	c
80223	9.8	c	80265	10.7	b
80225	14.12	c	80266	10.7	b
80228	13.3	c	80267	8.6	b
80229	4.2	b	80268	13.3	c
80231	10.7	c			
80232	8.6	x	TIL		
80237	8.6	b	82412	9.10	c
80238	16.1	a	82413	9.10	c
80242	12.1	b	82414	9.11	c
80246	4.2	b	82415	9.11	c
80248	16.1	a			

* Confidence levels: a, high; b, medium, c, low; x, unpaired or highly uncertain pairing.

References

Anonymous

1981. Antarctic Meteorite Newsletter, 4 (2):9-10.

1984. Antarctic Meteorite Newsletter, 7 (1):27-29.

Berkley, J.L., and J.H. Jones

1982. Primary Igneous Carbon in Ureilites: Petrological Implications. Journal of Geophysical Research, 87 (supplement): A353-A364.

Cassidy, W.A.

1980. Discussion. In U.B. Marvin and B. Mason, editors, Catalog of Antarctic Meteorites, 1977-1978. Smithsonian Contributions to the Earth Sciences, 23:42-44.

Clarke, R.S., Jr.

1982. The Derrick Peak, Antarctica, Iron Meteorites. Meteoritics, 17:129-134.

Clarke, R.S., Jr. and B. Mason

1982. A New Metal-Rich Mesosiderite from Antarctica, RKPA79015. Memoirs of the National Institute of Polar Research (Japan), special issue, 25:78-85.

Clarke, R.S., Jr., E. Jarosewich, J.I, Goldstein, and P.A. Baedecker

1980. Antarctic Iron Meteorites from Allan Hills and Purgatory Peak. Meteoritics, 15:273-274.

Delaney, J.S.

1985. Antarctic Meteorite Newsletter, 8 (1).

1986. Smithsonian Contributions to Earth Sciences, in press.

Delaney, J.S., M. Prinz, and H. Takeda

1984. The Polymict Eucrites. Journal of Geophysical Research, 89 (supplement):C251-C288.

Delaney, J.S.

1985. Antarctic Meteorite Newsletter, 8 (1).

1986. Smithsonian Contributions to Earth Sciences, in press.

Goswami, J.N., and K. Nishiizumi

1983. Cosmogenic Records in Antarctic Meteorites. Earth and Planetary Science Letters, 64:1-8.

Malvin, D.J., D. Wang, and J.T. Wasson

1984. Chemical Classification of Iron Meteorites--X. Multielement Studies of 43 Irons, Resolution of Group IIIE from IIIAB, and Evaluation of Cu as a Taxonomic Parameter. Geochimica et Cosmochimica Acta, 48:785-804.

Marvin, U.B.

1986. Meteorite Distributions and the Pairing Problem. Smithsonian Contributions to the Earth Sciences, in press.

Mason, B.

1983a. Antarctic Meteorite Newsletter, 6(1).

1983b. Antarctic Meteorite Newsletter, 6(2).

1984a. Antarctic Meteorite Newsletter, 7(1).

1984b. Antarctic Meteorite Newsletter, 7(2).

1985. Antarctic Meteorite Newsletter, 8(1).

1986a. Antarctic Meteorite Newsletter, 9(1).

1986b. Smithsonian Contributions to Earth Sciences, in press.

1986c. Antarctic Meteorite Newsletter, 9(2).

Mason, B., and R.S. Clarke, Jr.

1982. Characterization of the 1980-81 Victoria Land Meteorite Collections Memoirs of the National Institute of Polar Research (Japan), special issue, 25:17-33.

MacPherson, G.J.

1985a. Antarctic Meteorite Newsletter, 8(1).

1985b. Antarctic Meteorite Newsletter, 8(2).

McKinley, S.G., and K. Keil

1984. Petrology and Classification of 145 Small Meteorites from the 1977 Allan Hills Collection. In U.B. Marvin and B. Mason, editors, Field and Laboratory Investigations of Meteorites from Victoria Land, Antarctica. Smithsonian Contributions to the Earth Sciences, 26:55-71.

McKinley, S.G., E.R.D. Scott, G.J. Taylor, and K. Keil

1981. A Unique Type 3 Ordinary Chondrite Containing Graphite-Magnetite Aggregates--Allan Hills A77011. In Proceedings of the Twelfth Lunar and Planetary Science Conference, pages 1039-1048. New York: Pergamon Press.

McSween, H.Y., Jr.

1986. Antarctic Carbonaceous Chondrites: New Opportunities for Research. Smithsonian Contributions to the Earth Sciences, in press.

Nautiyal, C.M., J.T. Padia, M.N. Rao, T.R. Venkatesan, and J.N. Goswami

1982. Irradiation History of Antarctic Gas-Rich Meteorites. In Lunar and Planetary Science XIII, pages 578-579. Houston: Lunar and Planetary Institute.

Nishiizumi, K., J.R. Arnold, D. Elmore, X. Ma, D. Newman, and H.E. Gove

1983. ^{36}Cl and ^{53}Mn in Antarctic Meteorites and ^{10}Be-^{36}Cl Dating of Antarctic Ice. Earth and Planetary Science Letters, 62:407-417.

Sarafin, R., and U. Herpers

1983. Spallogenic ^{26}Al and ^{53}Mn in Antarctic Meteorites and Determination of Exposure and Terrestrial Ages. Meteoritics, 18:392.

Sarafin, R., M. Bourot-Denise, G. Crozaz, U. Herpers, P. Pellas, L. Schultz, and H.W. Weber.

1985. Cosmic Ray Effects in the Antarctic Meteorite Allan Hills A78084. Earth and Planetary Science Letters, 73:171-182.

Schultz, L.

1985. Terrestrial Ages of Antarctic Meteorites: Implications for Concentration Mechanisms. Abstracts for Workshop on Antarctic Meteorites, pages 41-43. Houston: Lunar and Planetary Institute.

Score, R.

1980. Allan Hills 77216: A Petrologic and Mineralogic Description. Meteoritics, 15:363.

1983 Antarctic Meteorite Newsletter, 6(2).

Score, R., C.M. Schwarz, T.V.V. King, B. Mason, D.D. Bogard, and E.M. Gabel

1981 Antarctic Meteorite Descriptions 1976-1977-1978-1979. Curatorial Branch Publication 54, JSC 17076, 144 pages. Houston: Johnson Space Center.

Score, R., C.M. Schwarz, B. Mason, and D.D. Bogard

1982a Antarctic Meteorite Descriptions 1980. Curatorial Branch Publication 60 JSC 18170, 55 pages. Houston: Johnson Space Center.

Score, R., T.V.V. King, C.M. Schwarz, A.M. Reid, and B. Mason,

1982b. Descriptions of Stony Meteorites. In U.B. Marvin and B. Mason, editors, Catalog of Meteorites from Victoria Land, Antarctica, 1978-1980. Smithsonian Contributions to the Earth Sciences, 24:19-48.

Score, R., C.M. Schwarz, and B. Mason,

1984. Descriptions of Stony Meteorites. In U.B. Marvin and B. Mason, editors, Field and Laboratory Investigations of Meteorites from Victoria Land, Antarctica. Smithsonian Contributions to the Earth Sciences, 26:23-47.

Scott, E.R.D.

1984. Pairing of Meteorites Found in Victoria Land, Antarctica. Memoirs of the National Institute of Polar Research (Japan), special issue, 35:102-125.

1986. Pairing of Meteorites from Victoria Land and The Thiel Mountains, Antarctica. Smithsonian Contributions to the Earth Sciences, in press.

Signer, P., H. Baur, Ph. Etique, and R. Wieler

1983. Light Noble Gases in 15 Meteorites. Meteoritics, 18:399.

Vogt, St., U. Herpers, R. Sarafin, P. Signer, R. Wieler, M. Suter, and W. Wölfli.

1985. Cosmic Ray Records in Antarctic Meteorites. Abstracts for Workshop on Antarctic Meteorites, pages 55-57. Houston: Lunar and Planetary Institute.

Weber, H.W., and L. Schultz

1980. Noble Gases in Ten Stone Meteorites from Antarctica. Zeitschrift für Naturforschung, 35a:44-49.

Wieler, R., H. Baur, Th. Graf, and P. Signer

1985. He, Ne, and Ar in Antarctic Meteorites: Solar Noble Gases in an Enstatite Chondrite. In Lunar and Planetary Science XVI, pages 902-903. Houston: Lunar and Planetary Institute.